



Understanding Peels and how they affect the skin

By Gay Wardle

For over a decade peeling agents, whether chemical, mechanical or phototherapy, have been used in a clinical environment to perform therapeutic and cosmetic enhancement treatments. These can provide epidermal or dermal stimulation with an accumulative effect for skin rejuvenation and firming. This article, presented by Gay Wardle, summarises how these agents affect the skin and how we can correctly use them to ensure the best possible results in improving skin condition and appearance.

Under your old skin is a new and fresher layer waiting to emerge. At least that is the theory behind why we should be performing topical peeling agents and exfoliating procedures! We want to renew the skin and encourage a fresh new layer of cells to emerge on the surface of the skin, making it look and feel years younger.

We have been bombarded with products containing ingredients touted to scrub away the outer layers of dead skin cells. However, understanding the science behind exfoliation is important for any skincare therapist as this will allow her to fully understand how these procedures impact the skin.

We know that the stratum corneum is the superficial strata of the epidermis and consists of several layers of corneocyte cells. These corneocytes are interspersed with layers of three key lipids – cholesterol, ceramide and linoleic. The stratum corneum is the first line of the skin's defence barrier maintaining the aqueous internal environment, as well as keeping out harmful toxins, allergens and microbes. Beyond the age of 65, the skin-cell maturation process slows up to 50 to 60 days for newer cells to reach the stratum corneum rather than 28 to 32 days in young adults, hence the reason why older skin can appear dull and waxy.

DAMAGE TO THE EPIDERMIS

There are two considerations why peeling procedures can harm rather than benefit the skin, and this is when the stratum corneum is removed with the vulnerable new cells exposed to environmental attack such as ultra-violet radiation and pollution.

When the skin barrier defence is disturbed it can take up to 36 hours to return to its natural protective state. Although any acute inflammation during the procedure itself is beneficial to encourage new cell rejuvenation, we must be aware of the recovery time needed and protect the skin from any environmental insults on the newly exposed cells. If this protection is not undertaken, the chronic inflammatory process could continue for weeks following the actual procedure. This could have an adverse impact on the benefits we are trying to achieve on the skin. This is why correct follow-up advice must be given following a peeling procedure.

THE COMPOSITION OF PEELS

Substances typically used for peeling procedures are found in nature, such as alpha-hydroxy acids or glycolic acids (AHAs), and are associated with fruits, spoilt milk, or sugarcane. AHAs

are generally used for mild skin scars and plugs of material within dilated hair follicles that frequently contain bacteria (comedones). Trichloroacetic acid and Jessner's peel (resorcinol, lactic acid and salicylic acid in ethanol) are stronger than AHA peels and cause destruction to the deeper layer of the skin. They are used to treat deep scars and skin growths, but also permit the underlying new skin to resurface. The penetrating ability of the acid peel generally depends on the type or concentration of acid used.

ALPHA HYDROXY ACIDS

AHAs are organic carboxylic acids with a hydroxy group in the alpha position. Research has now identified what changes can be expected within the cell structure of the skin. Epidermal changes seen with AHA use include a decrease in corneocytes cohesion above the stratum granulosum, an increase in epidermal thickness, a reversal of basal cell atypia, a dispersal of melanin pigmentation, and a return to a more normal rete pattern. Dermal changes include increases in papillary dermal thickness, acid mucopolysaccharide synthesis, fibroblast proliferation and collagen synthesis.³⁸ Ultrastructural changes include an increased number of desmosomes, increased tonofilament aggregation, decreased clumping of tonofilaments within the cytoplasm, increased perinuclear localisation of tonofilaments, and the formation of microvilli.³⁹

AHAs are useful in the treatment of photo-aged and intrinsically aged skin by reducing fine lines and wrinkles and evening out pigmentation. Besides improving the appearance of photo-aged skin, they are useful in pigmentary disorders such as melasma, ephelides and post-inflammatory hyperpigmentation, commonly abbreviated as (PIH).

For this reason AHAs are often incorporated into a post-op regimen for skin resurfacing to decrease the likelihood of developing PIH. They may also be used as adjunctive treatments prior to chemical peels to decrease the corneal layer, thereby allowing a more even penetration of active ingredients. AHAs also improve acne by inducing exfoliation and enhancing the comedolytic action of other active ingredients such as retinoids. The multitudinous applications of AHAs provide a strong foundation for the treatment of an assortment of skin conditions.

Glycolic acid is the simplest AHA, which has dual functionality of alcohol and acid in a low molecular weight structure. Because of its small molecular weight and size, it has a better capability to penetrate skin. AHA is used extensively in cosmetics. It is known that it diminishes the lines on the skin and make skin look younger by acting as a humectant to absorb moisture in air and by its exfoliating action breaking the bonds between dead skin cells.

BETA HYDROXY ACIDS

Salicylic acid is a hydroxyl derivative of benzoic acid and represents a carboxylic acid attached to the aromatic alcohol phenol.⁴¹ Although salicylic acid is not a beta-hydroxy acid by definition, it is referred to as a BHA in the cosmetic arena because it contains a hydroxy group in the beta position.⁴²

It is a lipid soluble molecule, restricting its site of action to the superficial epidermis and follicles.⁴² This lipid solubility accounts for its ability to expel comedones from follicles.

The hydroxy acids loosen the intercellular cement facilitating exfoliation of corneocytes, and also actually repair the horny layer at the level it is formed, rendering the keratin layer more compact. Most important, it is the repaired horny layer that gives the skin its moist and normal appearance.

Salicylic acid promotes exfoliation by dissolving intercellular cement and reducing intercorneocyte adhesion,^{44,45} but it has no effect on the mitotic activity of the epidermis.⁴⁶ As a salicylate, it contains anti-inflammatory properties via its effects on the arachadonic acid cascade.⁴⁷

Salicylic acid's unique comedolytic and anti-inflammatory properties make it a good agent for the treatment of comedonal and inflammatory acne vulgaris. It is also useful for the treatment of papular rosacea, photo-damage, fine lines and surface roughness, as well as for melasma with primarily epidermal deposits of melanin pigment.

LACTIC ACID

Lactic is one of the Alpha Hydroxy acids (fruit acids). Fruit acids are non-toxic, naturally occurring substances, and are found in a variety of fruits, such as grapes, apples and sugar cane. Other fruit acids are Citric, Malic, Glycolic and Pyruvic Acids.

Lactic Acid is a thorough exfoliator, removing the outer layers of thickened or damaged skin, leaving a smoother and healthier appearance. With prolonged use, Lactic Acid has been found to be beneficial in improving dry skin, treating age spots, improving oily and acne-prone skin, and decreasing fine lines and wrinkles.

MANDALIC ACID

An interesting newcomer to the AHAs is Mandelic Acid, which is a phenylglycolic acid and has an alpha-hydroxy acid (AHA) which has a hydroxyl group on the carbon atom next to the acid group. If the hydroxy group is on the second carbon next to the acid group, it is called beta-hydroxy acid. Mandelic Acid (alpha-hydroxybenzeneacetic acid) is the smallest AHA among compounds, which are part of an aromatic group. It has an asymmetric carbon atom and thus has two chiral isomers – the dextro and the levo. The D and L-mandelic acid are enantiomers (also called enantiomorph, which means that each molecule is asymmetrical and has the mirror image of the other). These affect pharmaceutical activity. Its structure provides the bacteriostatic property and is used also as an antiseptic ingredient.

Mandelic acid and its derivatives are used to apply the dual activities as an antibacterial agent and as an anti-ageing agent (AHA activity) similar to glycolic acid. It is used as an intermediate for the synthesis of target molecules for other applications. Naturally occurring mandelic acid is found when amygdalin (a cyanogenetic glycoside found in many plants, including bitter almond, apricot, and wild cherry) is hydrolysis



with hydrochloric acid, while amygdalin is broken down into glucose, benzaldehyde, and prussic acid (hydrogen cyanide) in the presence of sulfuric acid.

When combined with other AHA acids, Mandelic acid offers enhanced synergistic action that contributes to more rapid results in skin improvement for both problematic skin and anti-ageing benefits.

HYDROXY ACIDS AND WHAT AFFECTS THEIR PERFORMANCE

The efficacy of a topical hydroxy acid is determined by two major factors – the bioavailable concentration and the vehicle used.³⁷ The bioavailability of a hydroxy acid, or the fraction that permeates the stratum corneum is the fraction of free acid present in the formulation. The inherent pKa of the hydroxy acid as well as the pH of the formulation determine the amount of free acid in a formulation. If the pH of the formulation is less than the pKa of the acid, the free acid form predominates. If the pH of the formulation is greater than the pKa of the acid, the less-effective salt form predominates.

It is important to understand that although two products may contain equal percentages of a hydroxy acid, the bioavailability of that hydroxy acid may not be equal between the two products if the pH values of the carrier are different. For example, glycolic acid's pKa is 3.83. A 10% glycolic acid product formulated at pH 3.0 has a bioavailability of 0.06 and is quite effective on the skin. On the other hand, a 10% glycolic acid product formulated at pH 5.0 has a bioavailability of 0.06 and is much less effective.

The second major factor affecting efficacy is the vehicle or carrier, which determines the solubility of a hydroxy acid and the bioavailability though its pH, as discussed above. For water-soluble hydroxy acids, such as glycolic, lactic, malic, tartaric and citric acid, an oil-in-water emulsion is the vehicle of choice. For more lipid soluble hydroxy acids, such as mandelic, benzilic and salicylic acid, a water-in-oil formulation is the vehicle of choice. These are important considerations that will determine the effectiveness of an AHA's formulation.

This is why as a therapist you need to be assured and request evidence from the supplier or manufacturer that the AHA product they are providing you has addressed these issues in their formulation to ensure that they perform to your expectations in terms of results.

SIDE-EFFECTS AND THEIR MANAGEMENT

The most common side-effects of all topical hydroxy acid preparations are irritation and peeling of the skin. If excessive irritation does occur, you will need to decrease the frequency of application, or the strength of the formulation. Because this side-effect is very common, you should start with low-strength products and increase the strength of the formulation as tolerated. Clients may also note a tendency to sunburn more quickly than they did prior to starting the treatments. These clients should be instructed to always protect their skin with a broad-spectrum sunscreen and also minimise sun exposure.

MISCONCEPTIONS

There are two main misconceptions involving the hydroxy acids. The first involves erroneous concerns for photo-allergic reactions. Because the stratum corneum will thin with hydroxy acid use, clients may notice a tendency to sunburn more quickly. Clients should therefore be educated that this is not an allergic reaction, but rather an expected pharmacological effect.

The second misconception involves hydroxy acids being incorrectly included in the group of keratolytic agents. Because keratin proteins are not hydrolysed, it is more accurate to refer to this group of acids as *exfoliants*.⁴⁸ **The hydroxy acids loosen the intercellular cement facilitating exfoliation of corneocytes, and also actually repair the horny layer at the level it is formed, rendering the keratin layer more compact. Most important, it is the repaired horny layer that gives the skin its moist and normal appearance.**

CHEMICAL PEELS AND PRECAUTIONARY MEASURES

Most chemical peels performed in salons and spas are superficial. The skin appears smoother, while reducing blotchiness and other minor imperfections. The peel is usually neutralised after a predetermined duration of time. However, if erythema or epidermolysis occurs the peel must be immediately neutralised with 10-15% bicarbonate soda and usually redness fades quickly.

Different peels have a different end point, or maximum time they can be left on the skin. For example:

The end point for TCA peels is frosting, which is neutralised either with an agent or cold water.

The end point for salicylic acid peels is pseudo-frost formed when the salicylic acid crystallises – generally 1-3 coats are applied until even frosting occurs.

Medium-depth peels are more invasive, suitable for clients looking for more dramatic results. These stronger peels have a

longer recovery rates and can take up to 10 days for the peeling to stop. The end result would be a reduction in fine wrinkles, smoothed-out irregularities and lightened pigmented lesions.

SKIN PEELING THROUGH LASER

Laser peels have become very popular, with the procedures mostly performed in a medical environment under the supervision of a doctor. They are effectively cooking microscopic sections of the dermis, stimulating the fibroblasts, which produce collagen, elastin and glycosaminoglycans. Within four to six weeks, the skin should begin looking more plump, smoother, more even-coloured and showing fewer blood vessels. It is a relatively painless procedure that could have minor swelling lasting for up to a week.

Medium-depth laser peels work much the same way, with a longer recovery time, generally a few weeks. A few days after the peel the skin begins to slough off. Although painless it looks red, puffy and burnt. The skin can look severely sunburnt for some weeks.

While superficial peels are considered safe for all skin types up to phototype IV, medium-depth peels should be performed with great caution, especially on darker skin types. Deep peels are not recommended at all for darker skin types phototype V and VI.

INFORMED CONSENT

Pre-operative counselling and informed consent are absolutely vital when performing any of these procedures. A detailed consent form listing details about the procedure and possible complications should be viewed and explained to the client and signed by the client. The Consent Form should include, but not be limited to:

- Limitations of the treatment (if any)
- What to expect during and after the procedure
- What to do in the event of a reaction
- Post-treatment protective and precautionary measures
- How many treatments would be needed to achieve the desired end result
- Any potential side-effects

When performing peels you need to have a thorough understanding of skin types and how to recognise different skin conditions as this is imperative, as is completing a comprehensive medical questionnaire and conducting a thorough consultation process when performing any of these procedures.

Providing your client with the best after-care service with a post-procedure program, including antioxidants to support the skin's immunity and sunscreen to protect it from UVA and UVB exposure, is also very important. Similarly, the preparation leading up to performing the peel needs to be carefully planned. Always prepare the skin well in advance before treating with any peeling agents with antioxidants, regardless as to whether it is a chemical, micro-dermabrasion or laser peel. This preparation will ensure that your client will receive the best result you can deliver.

SKIN ANALYSIS TRAINING

If you believe you need to update your skills in skin analysis you will find training is available in the renowned Pastiche Method of Skin Analysis (see ad on page 24). Phone and request when a training session will be conducted in your area. 



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Gay Wardle is greatly respected as a trainer and educator in the aesthetic industry. She owns two multi-award-winning salons in Queensland and travels extensively throughout Australia training salons in IPL technologies and in Advanced Skin Analysis, being the Australian trainer for the renowned Pastiche Method of skin evaluation. Gay is currently pursuing a degree qualification in Dermal Sciences with the Victoria University. She trains others on her highly successful strategies that come from a strong understanding of what drives a salon to succeed and how to be known for exceptional results. Gay Wardle can be contacted on 0418 708 455.

